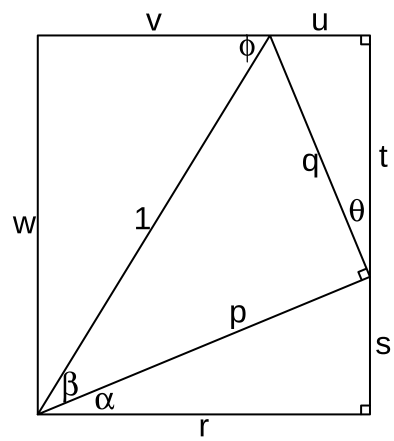
Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(225^\circ) = \frac{-\sqrt{2}}{2} \qquad \sin(210^\circ) = \frac{-1}{2}$$

$$\cos(225^\circ) = \frac{-\sqrt{2}}{2} \qquad \cos(210^\circ) = \frac{-\sqrt{3}}{2}$$

Determine $\sin(-15^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

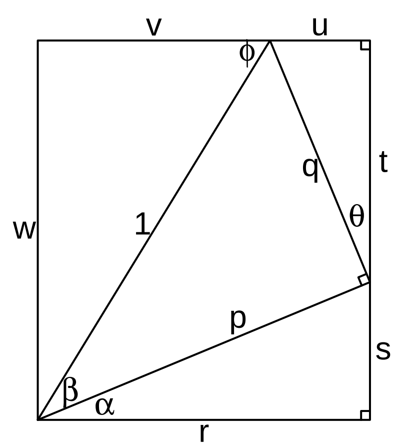
Question 6

Given $\cos(84°) \approx 0.1$, what is $\cos(42°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $84/2 = 42$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(45^\circ) = \frac{\sqrt{2}}{2} \qquad \sin(30^\circ) = \frac{1}{2}$$

$$\cos(45^\circ) = \frac{\sqrt{2}}{2} \qquad \cos(30^\circ) = \frac{\sqrt{3}}{2}$$

Determine $\sin(-15^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

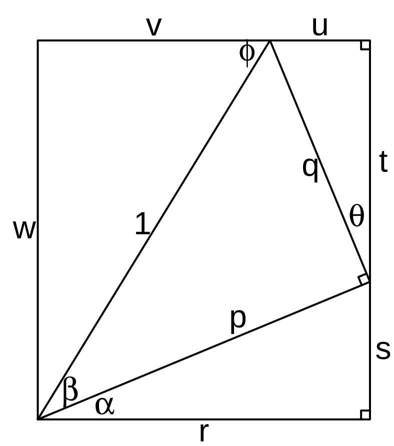
Question 6

Given $\cos(118°) \approx -0.47$, what is $\cos(59°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $118/2 = 59$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\sin(\alpha \pm \beta) = \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)$$
$$\cos(\alpha \pm \beta) = \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)$$

You know the following:

$$\sin(120°) = \frac{\sqrt{3}}{2} \qquad \sin(135°) = \frac{\sqrt{2}}{2}$$

$$\cos(120°) = \frac{-1}{2} \qquad \cos(135°) = \frac{-\sqrt{2}}{2}$$

Determine $\cos(255°)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

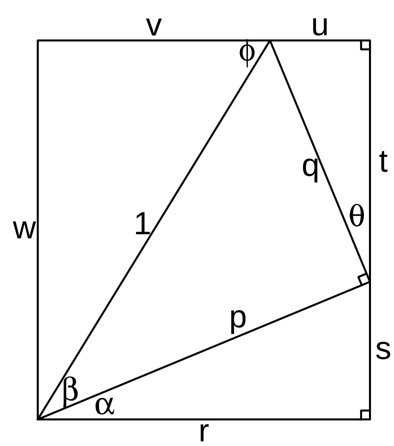
Question 6

Given $\cos(56°) \approx 0.56$, what is $\cos(28°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $56/2 = 28$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
$p\ =$	
$q\ =$	
$r\ =$	
$s\ =$	
$\theta\ =$	
$t\ =$	
$u\ =$	
$\phi\ =$	
$v\ =$	
$w\ =$	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(225^\circ) = \frac{-\sqrt{2}}{2} \qquad \sin(60^\circ) = \frac{\sqrt{3}}{2}$$

$$\cos(225^\circ) = \frac{-\sqrt{2}}{2} \qquad \cos(60^\circ) = \frac{1}{2}$$

Determine $\cos(285^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

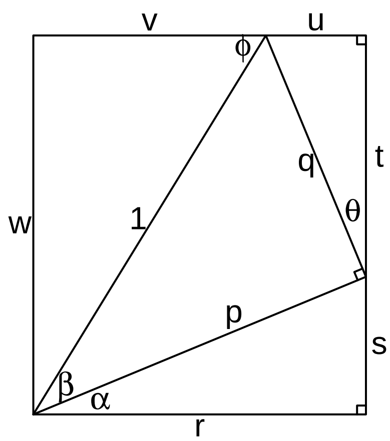
Question 6

Given $\cos(166°) \approx -0.97$, what is $\cos(83°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $166/2 = 83$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
$p\ =$	
$q\ =$	
$r\ =$	
$s\ =$	
$\theta\ =$	
$t\ =$	
$u\ =$	
$\phi\ =$	
$v\ =$	
$w\ =$	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(60°) = \frac{\sqrt{3}}{2} \qquad \sin(225°) = \frac{-\sqrt{2}}{2}$$

$$\cos(60°) = \frac{1}{2} \qquad \cos(225°) = \frac{-\sqrt{2}}{2}$$

Determine $\cos(165°)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

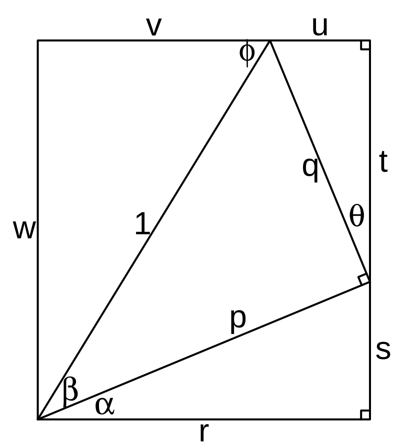
Question 6

Given $\cos(152°) \approx -0.88$, what is $\cos(76°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $152/2 = 76$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
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t =	
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v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(330^\circ) = \frac{-1}{2} \qquad \sin(315^\circ) = \frac{-\sqrt{2}}{2}$$

$$\cos(330^\circ) = \frac{\sqrt{3}}{2} \qquad \cos(315^\circ) = \frac{\sqrt{2}}{2}$$

Determine $\sin(645^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

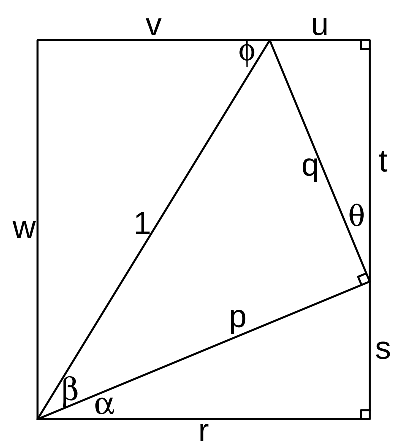
Question 6

Given $\cos(158°) \approx -0.93$, what is $\cos(79°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $158/2 = 79$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(225^\circ) = \frac{-\sqrt{2}}{2} \qquad \sin(120^\circ) = \frac{\sqrt{3}}{2}$$

$$\cos(225^\circ) = \frac{-\sqrt{2}}{2} \qquad \cos(120^\circ) = \frac{-1}{2}$$

Determine $\cos(-105^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

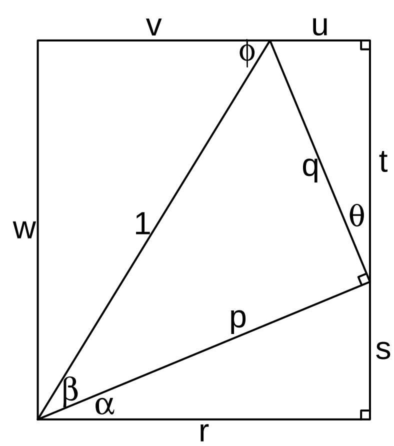
Question 6

Given $\cos(124°) \approx -0.56$, what is $\cos(62°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $124/2 = 62$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(45°) = \frac{\sqrt{2}}{2} \qquad \sin(120°) = \frac{\sqrt{3}}{2}$$

$$\cos(45°) = \frac{\sqrt{2}}{2} \qquad \cos(120°) = \frac{-1}{2}$$

Determine $\sin(165°)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

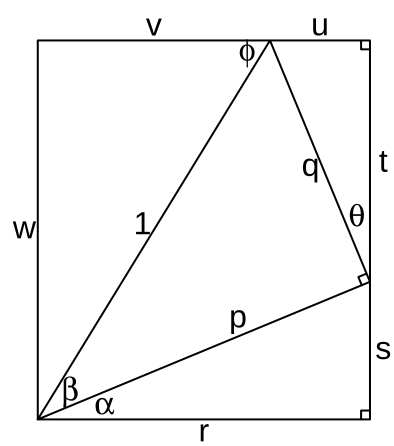
Question 6

Given $\cos(76°) \approx 0.24$, what is $\cos(38°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $76/2 = 38$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(210°) = \frac{-1}{2} \qquad \sin(45°) = \frac{\sqrt{2}}{2}$$

$$\cos(210°) = \frac{-\sqrt{3}}{2} \qquad \cos(45°) = \frac{\sqrt{2}}{2}$$

Determine $\sin(255°)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

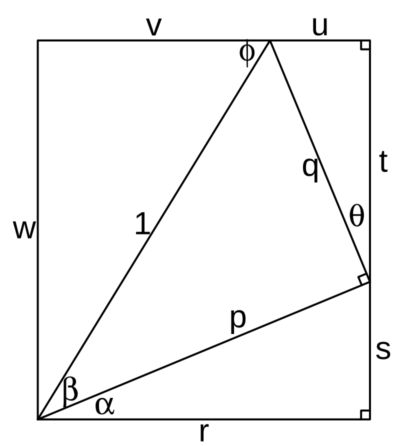
Question 6

Given $\cos(116°) \approx -0.44$, what is $\cos(58°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $116/2 = 58$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned} \sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta) \end{aligned}$$

You know the following:

$$\sin(120°) = \frac{\sqrt{3}}{2} \qquad \sin(135°) = \frac{\sqrt{2}}{2}$$

$$\cos(120°) = \frac{-1}{2} \qquad \cos(135°) = \frac{-\sqrt{2}}{2}$$

Determine $\sin(255°)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

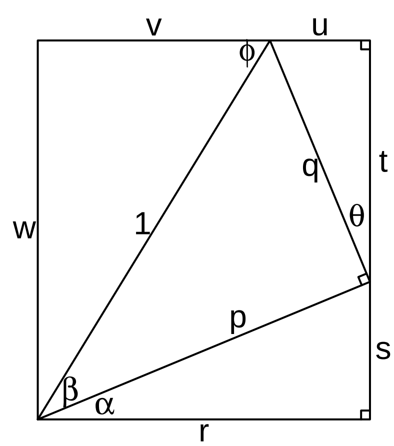
Question 6

Given $\cos(114°) \approx -0.41$, what is $\cos(57°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $114/2 = 57$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
$p\ =$	
$q\ =$	
$r\ =$	
$s\ =$	
$\theta\ =$	
$t\ =$	
$u\ =$	
$\phi\ =$	
$v\ =$	
$w\ =$	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(210°) = \frac{-1}{2} \qquad \sin(45°) = \frac{\sqrt{2}}{2}$$

$$\cos(210°) = \frac{-\sqrt{3}}{2} \qquad \cos(45°) = \frac{\sqrt{2}}{2}$$

Determine $\sin(-165°)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

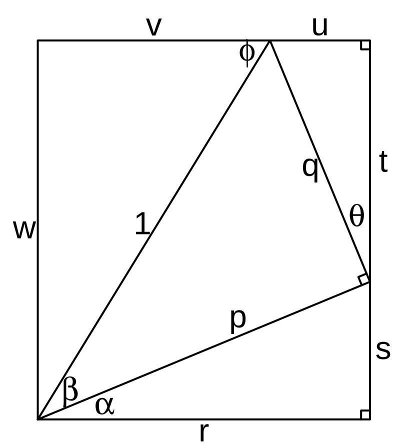
Question 6

Given $\cos(44^\circ) \approx 0.72$, what is $\cos(22^\circ)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $44/2 = 22$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
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s =	
θ =	
t =	
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w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(120^\circ) = \frac{\sqrt{3}}{2} \qquad \sin(315^\circ) = \frac{-\sqrt{2}}{2}$$

$$\cos(120^\circ) = \frac{-1}{2} \qquad \cos(315^\circ) = \frac{\sqrt{2}}{2}$$

Determine $\cos(435^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

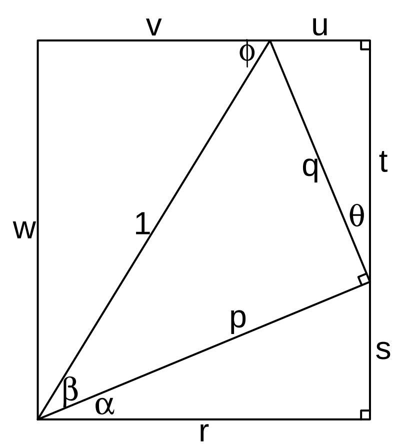
Question 6

Given $\cos(92°) \approx -0.03$, what is $\cos(46°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $92/2 = 46$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
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r =	
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θ =	
t =	
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v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(60^\circ) = \frac{\sqrt{3}}{2} \qquad \sin(225^\circ) = \frac{-\sqrt{2}}{2}$$

$$\cos(60^\circ) = \frac{1}{2} \qquad \cos(225^\circ) = \frac{-\sqrt{2}}{2}$$

Determine $\sin(-165^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

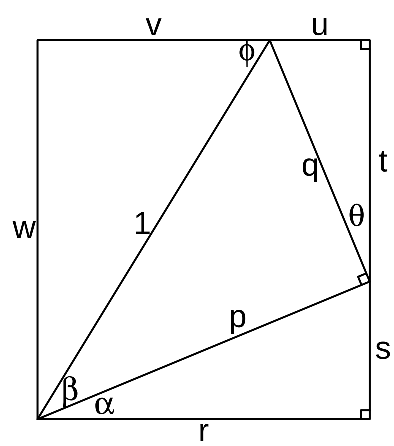
Question 6

Given $\cos(140^\circ) \approx -0.77$, what is $\cos(70^\circ)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $140/2 = 70$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(150^\circ) = \frac{1}{2} \qquad \sin(315^\circ) = \frac{-\sqrt{2}}{2}$$

$$\cos(150^\circ) = \frac{-\sqrt{3}}{2} \qquad \cos(315^\circ) = \frac{\sqrt{2}}{2}$$

Determine $\sin(-165^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

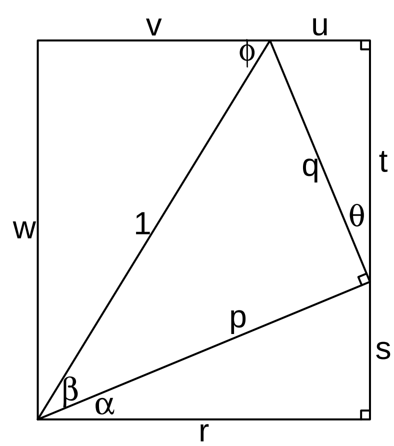
Question 6

Given $\cos(126°) \approx -0.59$, what is $\cos(63°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $126/2 = 63$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
$p\ =$	
$q\ =$	
$r\ =$	
$s\ =$	
$\theta\ =$	
$t\ =$	
$u\ =$	
$\phi\ =$	
$v\ =$	
$w\ =$	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(150^\circ) = \frac{1}{2} \qquad \sin(45^\circ) = \frac{\sqrt{2}}{2}$$

$$\cos(150^\circ) = \frac{-\sqrt{3}}{2} \qquad \cos(45^\circ) = \frac{\sqrt{2}}{2}$$

Determine $\sin(195^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

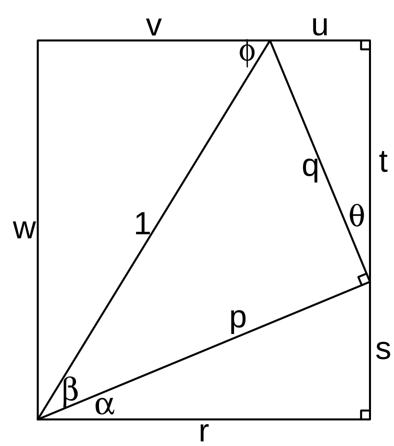
Question 6

Given $\cos(30°) \approx 0.87$, what is $\cos(15°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $30/2 = 15$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned} \sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta) \end{aligned}$$

You know the following:

$$\sin(135^\circ) = \frac{\sqrt{2}}{2} \qquad \sin(120^\circ) = \frac{\sqrt{3}}{2}$$

$$\cos(135^\circ) = \frac{-\sqrt{2}}{2} \qquad \cos(120^\circ) = \frac{-1}{2}$$

Determine $\sin(255^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

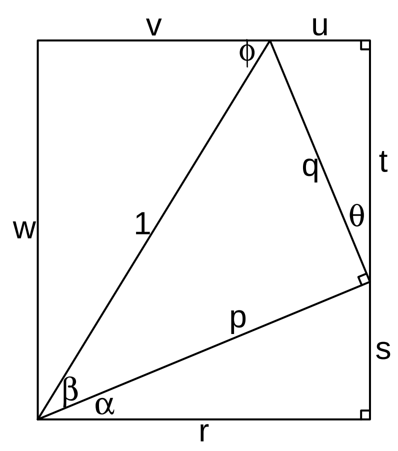
Question 6

Given $\cos(66°) \approx 0.41$, what is $\cos(33°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $66/2 = 33$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
$p\ =$	
$q\ =$	
$r\ =$	
$s\ =$	
$\theta\ =$	
$t\ =$	
$u\ =$	
$\phi\ =$	
$v\ =$	
$w\ =$	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned} \sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta) \end{aligned}$$

You know the following:

$$\sin(45°) = \frac{\sqrt{2}}{2} \qquad \sin(120°) = \frac{\sqrt{3}}{2}$$

$$\cos(45°) = \frac{\sqrt{2}}{2} \qquad \cos(120°) = \frac{-1}{2}$$

Determine $\sin(-75°)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

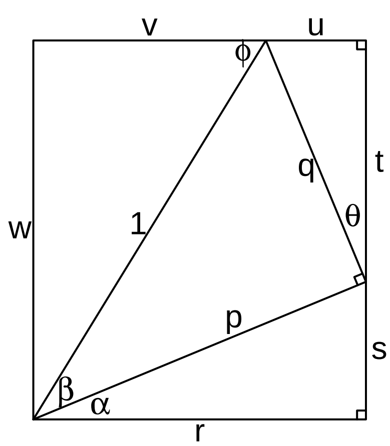
Question 6

Given $\cos(72°) \approx 0.31$, what is $\cos(36°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $72/2 = 36$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(150^\circ) = \frac{1}{2} \qquad \sin(225^\circ) = \frac{-\sqrt{2}}{2}$$

$$\cos(150^\circ) = \frac{-\sqrt{3}}{2} \qquad \cos(225^\circ) = \frac{-\sqrt{2}}{2}$$

Determine $\sin(75^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

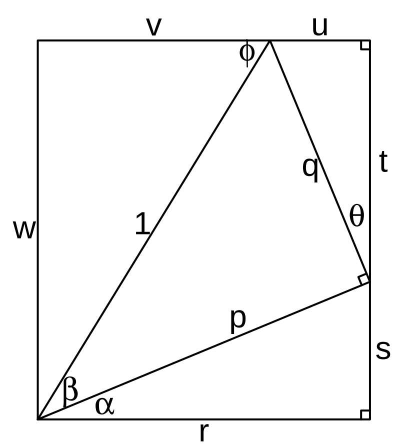
Question 6

Given $\cos(56°) \approx 0.56$, what is $\cos(28°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $56/2 = 28$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
$p\ =$	
$q\ =$	
$r\ =$	
$s\ =$	
$\theta\ =$	
$t\ =$	
$u\ =$	
$\phi\ =$	
$v\ =$	
$w\ =$	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(315^\circ) = \frac{-\sqrt{2}}{2} \qquad \sin(30^\circ) = \frac{1}{2}$$

$$\cos(315^\circ) = \frac{\sqrt{2}}{2} \qquad \cos(30^\circ) = \frac{\sqrt{3}}{2}$$

Determine $\cos(-285^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

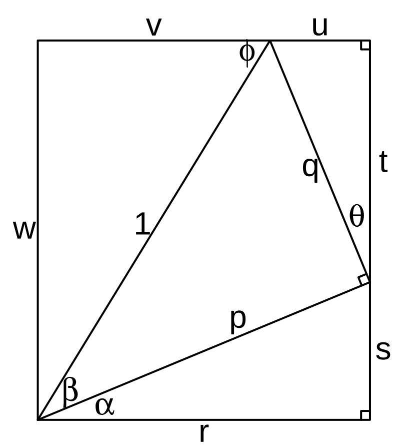
Question 6

Given $\cos(108°) \approx -0.31$, what is $\cos(54°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $108/2 = 54$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
$p\ =$	
$q\ =$	
$r\ =$	
$s\ =$	
$\theta\ =$	
$t\ =$	
$u\ =$	
$\phi\ =$	
$v\ =$	
$w\ =$	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(225^\circ) = \frac{-\sqrt{2}}{2} \qquad \sin(30^\circ) = \frac{1}{2}$$

$$\cos(225^\circ) = \frac{-\sqrt{2}}{2} \qquad \cos(30^\circ) = \frac{\sqrt{3}}{2}$$

Determine $\cos(255^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

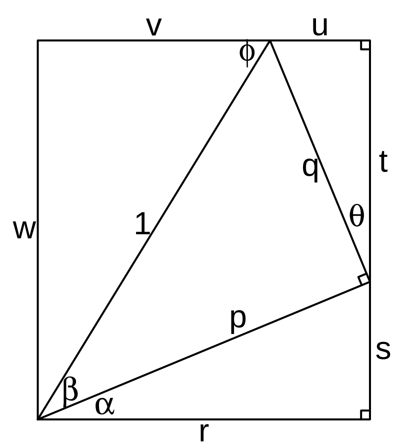
Question 6

Given $\cos(82°) \approx 0.14$, what is $\cos(41°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $82/2 = 41$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\sin(\alpha \pm \beta) = \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)$$
$$\cos(\alpha \pm \beta) = \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)$$

You know the following:

$$\sin(300°) = \frac{-\sqrt{3}}{2} \qquad \sin(45°) = \frac{\sqrt{2}}{2}$$

$$\cos(300°) = \frac{1}{2} \qquad \cos(45°) = \frac{\sqrt{2}}{2}$$

Determine $\sin(345°)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

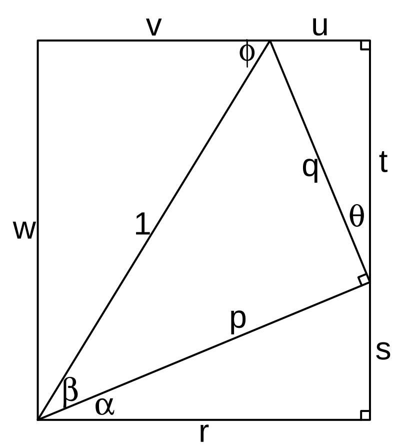
Question 6

Given $\cos(68°) \approx 0.37$, what is $\cos(34°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $68/2 = 34$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(135°) = \frac{\sqrt{2}}{2} \qquad \sin(60°) = \frac{\sqrt{3}}{2}$$

$$\cos(135°) = \frac{-\sqrt{2}}{2} \qquad \cos(60°) = \frac{1}{2}$$

Determine $\sin(195°)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

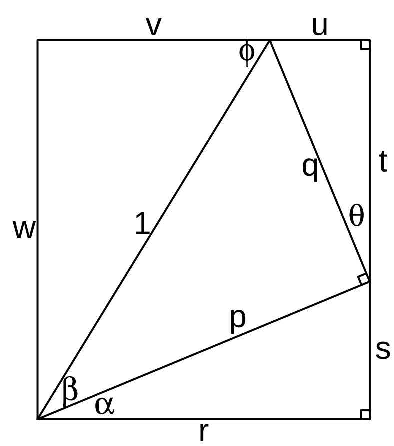
Question 6

Given $\cos(70°) \approx 0.34$, what is $\cos(35°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $70/2 = 35$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned} \sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta) \end{aligned}$$

You know the following:

$$\sin(210°) = \frac{-1}{2} \qquad \sin(315°) = \frac{-\sqrt{2}}{2}$$

$$\cos(210°) = \frac{-\sqrt{3}}{2} \qquad \cos(315°) = \frac{\sqrt{2}}{2}$$

Determine $\sin(-105°)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

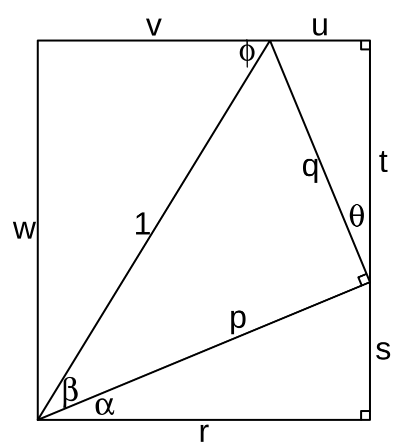
Question 6

Given $\cos(96^\circ) \approx -0.1$, what is $\cos(48^\circ)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $96/2 = 48$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(330^\circ) = \frac{-1}{2} \qquad \sin(135^\circ) = \frac{\sqrt{2}}{2}$$

$$\cos(330^\circ) = \frac{\sqrt{3}}{2} \qquad \cos(135^\circ) = \frac{-\sqrt{2}}{2}$$

Determine $\cos(-195^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

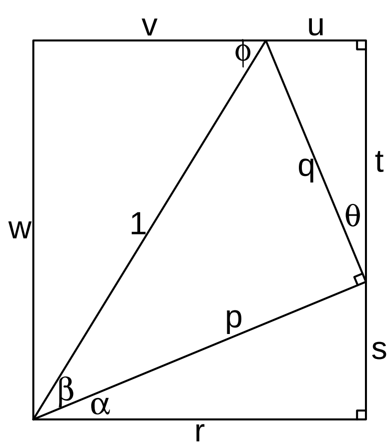
Question 6

Given $\cos(106°) \approx -0.28$, what is $\cos(53°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $106/2 = 53$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
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r =	
s =	
θ =	
t =	
u =	
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Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(45°) = \frac{\sqrt{2}}{2} \qquad \sin(120°) = \frac{\sqrt{3}}{2}$$

$$\cos(45°) = \frac{\sqrt{2}}{2} \qquad \cos(120°) = \frac{-1}{2}$$

Determine $\sin(165°)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

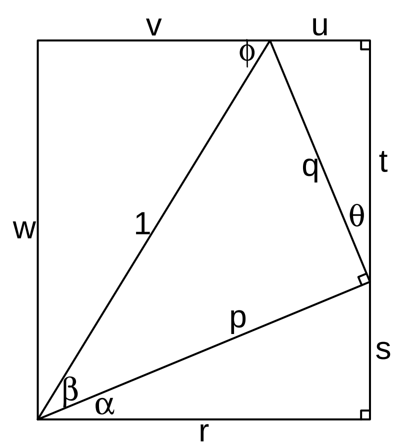
Question 6

Given $\cos(84°) \approx 0.1$, what is $\cos(42°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $84/2 = 42$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
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$r =$	
$s =$	
$\theta =$	
$t =$	
$u =$	
$\phi =$	
$v =$	
$w =$	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(210^\circ) = \frac{-1}{2} \qquad \sin(135^\circ) = \frac{\sqrt{2}}{2}$$

$$\cos(210^\circ) = \frac{-\sqrt{3}}{2} \qquad \cos(135^\circ) = \frac{-\sqrt{2}}{2}$$

Determine $\sin(-75^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

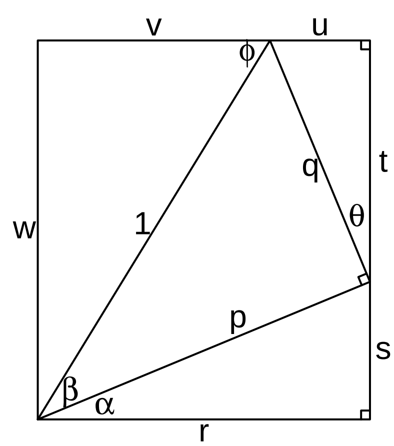
Question 6

Given $\cos(128°) \approx -0.62$, what is $\cos(64°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $128/2 = 64$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(45^\circ) = \frac{\sqrt{2}}{2} \qquad \sin(120^\circ) = \frac{\sqrt{3}}{2}$$

$$\cos(45^\circ) = \frac{\sqrt{2}}{2} \qquad \cos(120^\circ) = \frac{-1}{2}$$

Determine $\cos(165^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

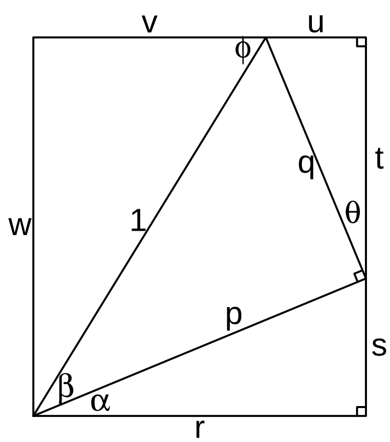
Question 6

Given $\cos(80^\circ) \approx 0.17$, what is $\cos(40^\circ)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $80/2 = 40$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(30^\circ) = \frac{1}{2} \qquad \sin(45^\circ) = \frac{\sqrt{2}}{2}$$

$$\cos(30^\circ) = \frac{\sqrt{3}}{2} \qquad \cos(45^\circ) = \frac{\sqrt{2}}{2}$$

Determine $\cos(75^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

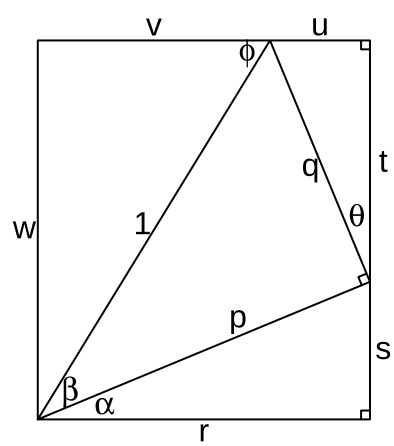
Question 6

Given $\cos(154°) \approx -0.9$, what is $\cos(77°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $154/2 = 77$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$
\begin{aligned}
\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \\
\cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)
\end{aligned}
$$

You know the following:

$$\sin(315^\circ) = \frac{-\sqrt{2}}{2} \qquad \sin(30^\circ) = \frac{1}{2}$$

$$\cos(315^\circ) = \frac{\sqrt{2}}{2} \qquad \cos(30^\circ) = \frac{\sqrt{3}}{2}$$

Determine $\cos(285^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

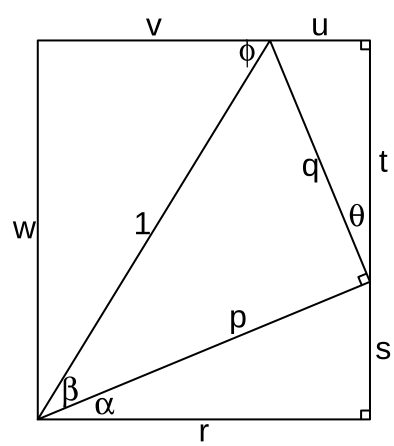
Question 6

Given $\cos(66°) \approx 0.41$, what is $\cos(33°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $66/2 = 33$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(45^\circ) = \frac{\sqrt{2}}{2} \qquad \sin(210^\circ) = \frac{-1}{2}$$

$$\cos(45^\circ) = \frac{\sqrt{2}}{2} \qquad \cos(210^\circ) = \frac{-\sqrt{3}}{2}$$

Determine $\sin(165^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

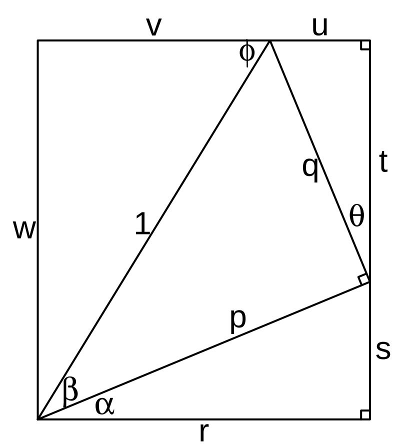
Question 6

Given $\cos(154°) \approx -0.9$, what is $\cos(77°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $154/2 = 77$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\sin(\alpha \pm \beta) = \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)$$
$$\cos(\alpha \pm \beta) = \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)$$

You know the following:

$$\sin(60^\circ) = \frac{\sqrt{3}}{2} \qquad \sin(225^\circ) = \frac{-\sqrt{2}}{2}$$

$$\cos(60^\circ) = \frac{1}{2} \qquad \cos(225^\circ) = \frac{-\sqrt{2}}{2}$$

Determine $\sin(285^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

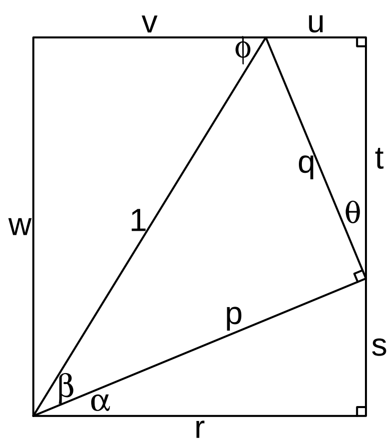
Question 6

Given $\cos(142°) \approx -0.79$, what is $\cos(71°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $142/2 = 71$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(30^\circ) = \frac{1}{2} \qquad \sin(45^\circ) = \frac{\sqrt{2}}{2}$$

$$\cos(30^\circ) = \frac{\sqrt{3}}{2} \qquad \cos(45^\circ) = \frac{\sqrt{2}}{2}$$

Determine $\cos(-15^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

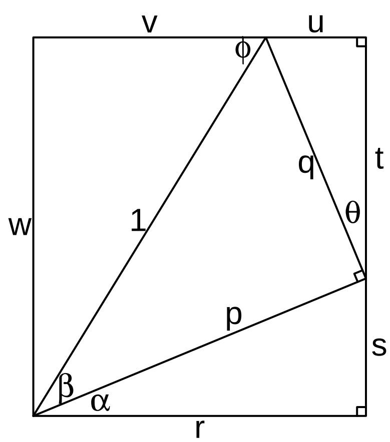
Question 6

Given $\cos(36°) \approx 0.81$, what is $\cos(18°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $36/2 = 18$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(45^\circ) = \frac{\sqrt{2}}{2} \qquad \sin(210^\circ) = \frac{-1}{2}$$

$$\cos(45^\circ) = \frac{\sqrt{2}}{2} \qquad \cos(210^\circ) = \frac{-\sqrt{3}}{2}$$

Determine $\cos(-165^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

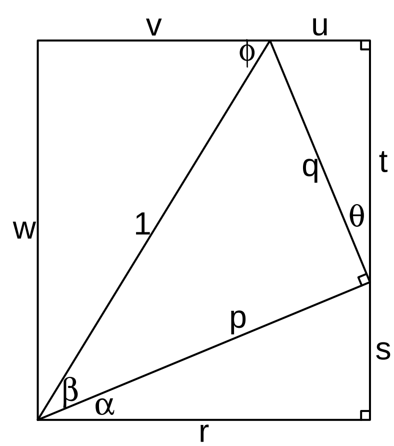
Question 6

Given $\cos(168°) \approx -0.98$, what is $\cos(84°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $168/2 = 84$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
$p\ =$	
$q\ =$	
$r\ =$	
$s\ =$	
$\theta\ =$	
$t\ =$	
$u\ =$	
$\phi\ =$	
$v\ =$	
$w\ =$	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned} \sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta) \end{aligned}$$

You know the following:

$$\sin(225°) = \frac{-\sqrt{2}}{2} \qquad \sin(300°) = \frac{-\sqrt{3}}{2}$$

$$\cos(225°) = \frac{-\sqrt{2}}{2} \qquad \cos(300°) = \frac{1}{2}$$

Determine $\cos(-75°)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

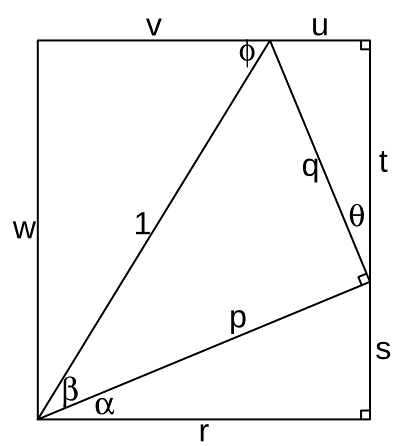
Question 6

Given $\cos(122°) \approx -0.53$, what is $\cos(61°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $122/2 = 61$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\sin(\alpha \pm \beta) = \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)$$
$$\cos(\alpha \pm \beta) = \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)$$

You know the following:

$$\sin(210°) = \frac{-1}{2} \qquad \sin(135°) = \frac{\sqrt{2}}{2}$$

$$\cos(210°) = \frac{-\sqrt{3}}{2} \qquad \cos(135°) = \frac{-\sqrt{2}}{2}$$

Determine $\cos(-75°)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

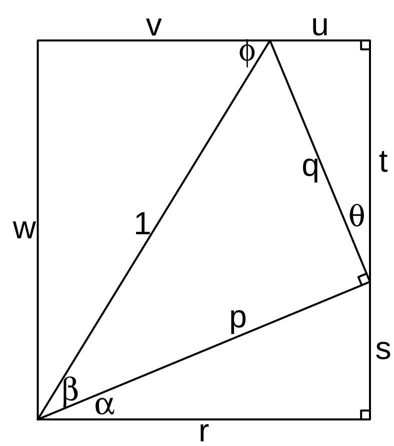
Question 6

Given $\cos(102°) \approx -0.21$, what is $\cos(51°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $102/2 = 51$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}
\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \\
\cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)
\end{aligned}$$

You know the following:

$$\sin(225^\circ) = \frac{-\sqrt{2}}{2} \qquad \sin(60^\circ) = \frac{\sqrt{3}}{2}$$

$$\cos(225^\circ) = \frac{-\sqrt{2}}{2} \qquad \cos(60^\circ) = \frac{1}{2}$$

Determine $\cos(165^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

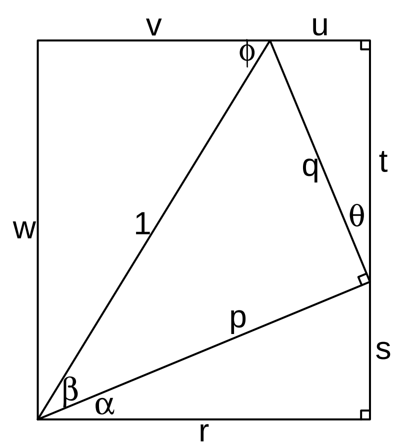
Question 6

Given $\cos(46°) \approx 0.69$, what is $\cos(23°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $46/2 = 23$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(315^\circ) = \frac{-\sqrt{2}}{2} \qquad \sin(30^\circ) = \frac{1}{2}$$

$$\cos(315^\circ) = \frac{\sqrt{2}}{2} \qquad \cos(30^\circ) = \frac{\sqrt{3}}{2}$$

Determine $\sin(345^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

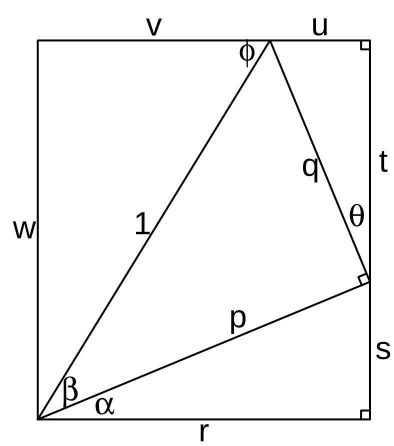
Question 6

Given $\cos(54°) \approx 0.59$, what is $\cos(27°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $54/2 = 27$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(240^\circ) = \frac{-\sqrt{3}}{2} \qquad \sin(315^\circ) = \frac{-\sqrt{2}}{2}$$

$$\cos(240^\circ) = \frac{-1}{2} \qquad \cos(315^\circ) = \frac{\sqrt{2}}{2}$$

Determine $\cos(555^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

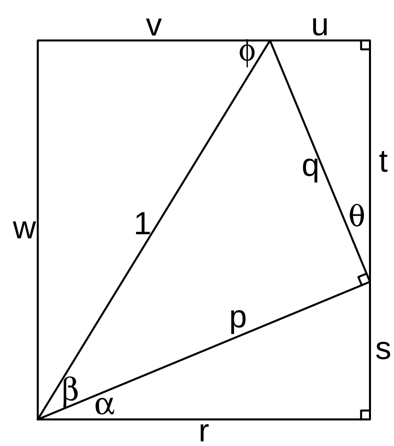
Question 6

Given $\cos(148°) \approx -0.85$, what is $\cos(74°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $148/2 = 74$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(45^\circ) = \frac{\sqrt{2}}{2} \qquad \sin(240^\circ) = \frac{-\sqrt{3}}{2}$$

$$\cos(45^\circ) = \frac{\sqrt{2}}{2} \qquad \cos(240^\circ) = \frac{-1}{2}$$

Determine $\sin(285^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

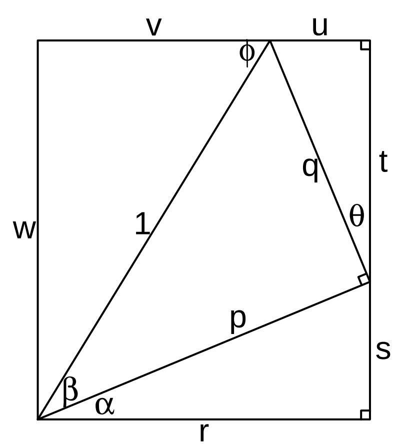
Question 6

Given $\cos(144°) \approx -0.81$, what is $\cos(72°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $144/2 = 72$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(240°) = \frac{-\sqrt{3}}{2} \qquad \sin(135°) = \frac{\sqrt{2}}{2}$$

$$\cos(240°) = \frac{-1}{2} \qquad \cos(135°) = \frac{-\sqrt{2}}{2}$$

Determine $\sin(105°)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

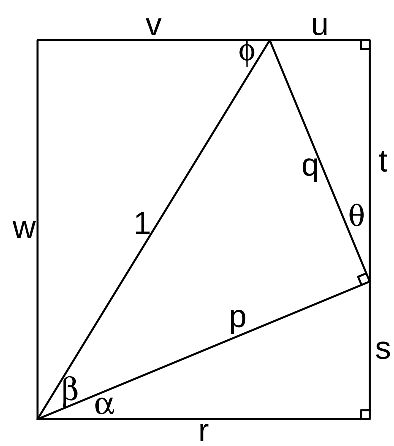
Question 6

Given $\cos(108°) \approx -0.31$, what is $\cos(54°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $108/2 = 54$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(135^\circ) = \frac{\sqrt{2}}{2} \qquad \sin(30^\circ) = \frac{1}{2}$$

$$\cos(135^\circ) = \frac{-\sqrt{2}}{2} \qquad \cos(30^\circ) = \frac{\sqrt{3}}{2}$$

Determine $\cos(165^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

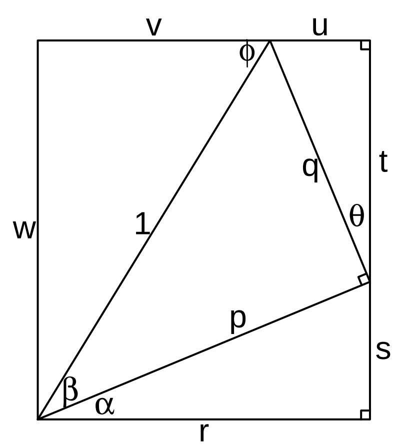
Question 6

Given $\cos(100°) \approx -0.17$, what is $\cos(50°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $100/2 = 50$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned} \sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta) \end{aligned}$$

You know the following:

$$\sin(225°) = \frac{-\sqrt{2}}{2} \qquad \sin(150°) = \frac{1}{2}$$

$$\cos(225°) = \frac{-\sqrt{2}}{2} \qquad \cos(150°) = \frac{-\sqrt{3}}{2}$$

Determine $\sin(-75°)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

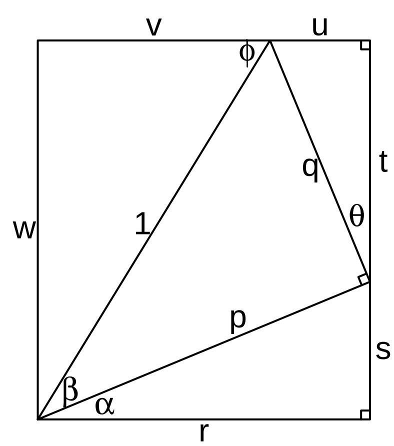
Question 6

Given $\cos(88^\circ) \approx 0.03$, what is $\cos(44^\circ)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $88/2 = 44$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
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Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(315^\circ) = \frac{-\sqrt{2}}{2} \qquad \sin(120^\circ) = \frac{\sqrt{3}}{2}$$

$$\cos(315^\circ) = \frac{\sqrt{2}}{2} \qquad \cos(120^\circ) = \frac{-1}{2}$$

Determine $\sin(435^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

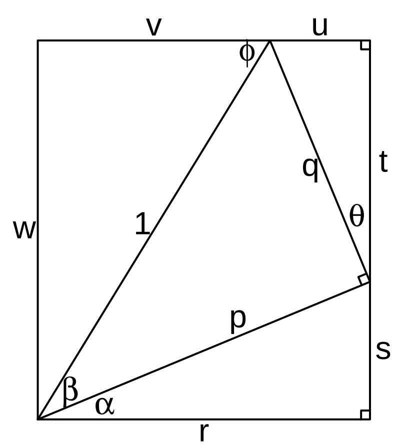
Question 6

Given $\cos(162°) \approx -0.95$, what is $\cos(81°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $162/2 = 81$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
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Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(45^\circ) = \frac{\sqrt{2}}{2} \qquad \sin(210^\circ) = \frac{-1}{2}$$

$$\cos(45^\circ) = \frac{\sqrt{2}}{2} \qquad \cos(210^\circ) = \frac{-\sqrt{3}}{2}$$

Determine $\sin(255^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

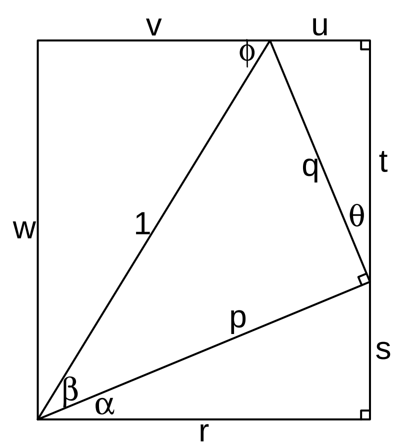
Question 6

Given $\cos(134°) \approx -0.69$, what is $\cos(67°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $134/2 = 67$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
q =	
r =	
s =	
θ =	
t =	
u =	
ϕ =	
v =	
w =	

Question 2

The angle-sum and angle-difference identities are listed below:

$$\sin(\alpha \pm \beta) = \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)$$
$$\cos(\alpha \pm \beta) = \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)$$

You know the following:

$$\sin(300°) = \frac{-\sqrt{3}}{2} \qquad \sin(135°) = \frac{\sqrt{2}}{2}$$

$$\cos(300°) = \frac{1}{2} \qquad \cos(135°) = \frac{-\sqrt{2}}{2}$$

Determine $\sin(165°)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

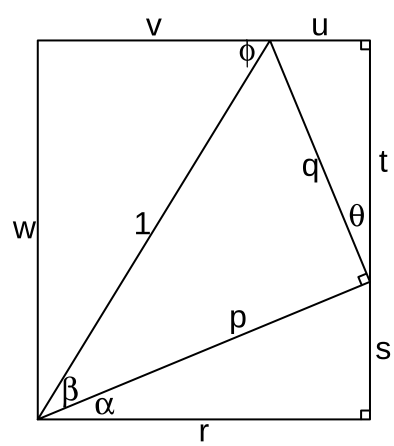
Question 6

Given $\cos(24°) \approx 0.91$, what is $\cos(12°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $24/2 = 12$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
p =	
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Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(30°) = \frac{1}{2} \qquad \sin(225°) = \frac{-\sqrt{2}}{2}$$

$$\cos(30°) = \frac{\sqrt{3}}{2} \qquad \cos(225°) = \frac{-\sqrt{2}}{2}$$

Determine $\sin(255°)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

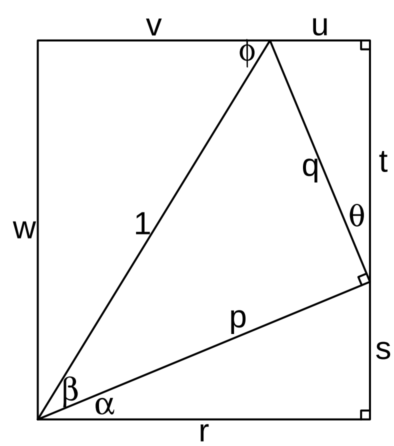
Question 6

Given $\cos(136^\circ) \approx -0.72$, what is $\cos(68^\circ)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $136/2 = 68$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
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Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(45^\circ) = \frac{\sqrt{2}}{2} \qquad \sin(300^\circ) = \frac{-\sqrt{3}}{2}$$

$$\cos(45^\circ) = \frac{\sqrt{2}}{2} \qquad \cos(300^\circ) = \frac{1}{2}$$

Determine $\sin(-255^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

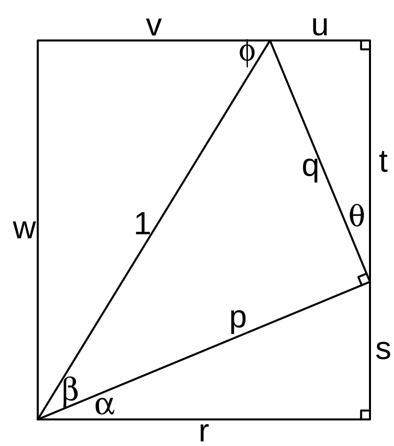
Question 6

Given $\cos(140°) \approx -0.77$, what is $\cos(70°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $140/2 = 70$*.)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
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Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(225^\circ) = \frac{-\sqrt{2}}{2} \qquad \sin(300^\circ) = \frac{-\sqrt{3}}{2}$$

$$\cos(225^\circ) = \frac{-\sqrt{2}}{2} \qquad \cos(300^\circ) = \frac{1}{2}$$

Determine $\sin(75^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

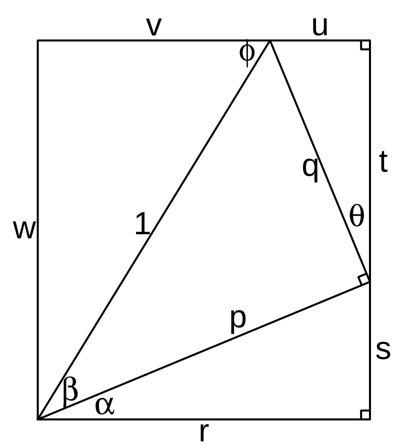
Question 6

Given $\cos(118°) \approx -0.47$, what is $\cos(59°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $118/2 = 59$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



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Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta)\\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(135°) = \frac{\sqrt{2}}{2} \qquad \sin(120°) = \frac{\sqrt{3}}{2}$$

$$\cos(135°) = \frac{-\sqrt{2}}{2} \qquad \cos(120°) = \frac{-1}{2}$$

Determine $\sin(255°)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

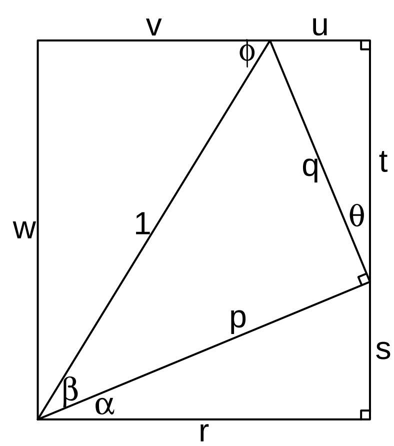
Question 6

Given $\cos(66°) \approx 0.41$, what is $\cos(33°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $66/2 = 33$.*)*

Question 1

In terms of α and β, express all the lengths and other angle measures (θ and ϕ).



Variable	Algebraic expression
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$s =$	
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$v =$	
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Question 2

The angle-sum and angle-difference identities are listed below:

$$\begin{aligned}\sin(\alpha \pm \beta) &= \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \\ \cos(\alpha \pm \beta) &= \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)\end{aligned}$$

You know the following:

$$\sin(30^\circ) = \frac{1}{2} \qquad \sin(225^\circ) = \frac{-\sqrt{2}}{2}$$

$$\cos(30^\circ) = \frac{\sqrt{3}}{2} \qquad \cos(225^\circ) = \frac{-\sqrt{2}}{2}$$

Determine $\cos(255^\circ)$ exactly.

Question 3

Prove the (sine) double-angle identity: $\sin(2x) = 2\sin(x)\cos(x)$

(Hint: start with an angle-sum formula from Question 2.)

Question 4

Prove the (cosine) double-angle identity: $\cos(2x) = 2\cos^2(x) - 1$

(Hint: start with an angle-sum formula from Question 2. Also, you will need to use the Pythagorean Identity: $\sin^2(x) + \cos^2(x) = 1$*)*

Question 5

Prove the (cosine) half-angle identity: $\cos\left(\frac{y}{2}\right) = \pm\sqrt{\frac{1+\cos(y)}{2}}$.

(Hint: start with the double-angle identity from Question 4.)

Question 6

Given $\cos(88°) \approx 0.03$, what is $\cos(44°)$? Please set up an expression, but do **not** try to simplify or evaluate a decimal approximation.

(Hint: $88/2 = 44$.*)*